wavelength), the multi-layer stack causes reflection of optical radiation to occur not only at (and around) the predetermined "design" wavelength, but also at (and around) other wavelengths corresponding to "higher order" frequencies equal to an odd-integer multiple of the "design" frequency. The result is known as a "¼-wave" stack, or "interference filter".

Thus, such a quarter-wave stack may be employed as an optical filter for reflecting IR radiation by selecting the predetermined wavelength to be a suitable IR wavelength such that a reflection band is formed adjacent a desired spectral pass-band. However, a drawback of such interference filters is that the aforementioned "higher order" reflection bands often reside well within the desired spectral pass-band. Thus, such filters may well reflect radiation which it is not desirable to reflect.

Other types of multi-stack optical interference filter have been proposed in which the multi-layer stack is composed of materials having three different refractive indices rather than just two. An example of that sort of optical filter is described in US 6 107 564. By appropriately arranging the three different layer types in a repeating pattern within the

stack of layers, the resultant structure is able to suppress the first few of the offending "higher

Accordingly, in a first of its aspects, the present invention may provide an optical filter including a substrate having a plurality of layers of materials stacked upon it each of which layers is formed from one or both of:

a first material having a first index of refraction; and,

a second material having a second index of refraction being less than the first index of refraction;

wherein the plurality of layers of materials include a first layer and a second layer each and a third layer formed from the first material (H) being stacked in between the first layer and the second layer;

wherein the optical thickness of each of said first and said second layers is greater than the optical thickness of said third layer,

characterized in that the first layer and second layers are each formed from an inhomogeneous mixture (M) of said first material (H) and said second material (L), in that the optical thickness of said first layer and of said second layer each differ in magnitude from the value 2Q by less than Q/2, and the optical thickness of said third layer differs in magnitude from the value Q by less than Q/2, where Q is the thickness of a given said layer traversed by substantially one quarter of a wavelength of optical radiation of a common reference wavelength at

traversed by substantially one quarter of a wavelength of optical radiation of a common reference wavelength at which said optical thicknesses are determined, and in that all variations in the index of refraction (21 or 25 or 27 ; 23 or 26 or 28) of the first and second layer increase that index of refraction as the depth of the respective layer increases from regions thereof remote from said third layer to regions thereof proximate the third layer.

Due to the inhomogeneous mixing of the first material and the second material, when forming the first and second layers, the index of refraction of those layers varies with the depth of the layer between values greater than the second index of refraction and less than the first index of refraction.

Thus, by constructing an interference filter in the form of a multi-layer stack (on a substrate) comprising a

Accordingly, in a third of its aspects, the present invention may provide a method of producing an optical filter for use with a photovoltaic cell, the method including:

providing a substrate;

stacking a plurality of layers of materials upon the substrate each of which layers is formed from one or both of:

a first material having a first index of refraction; and,

a second material having a second index of refraction being less than the first index of refraction;

including forming a first layer and a second layer of the plurality of layers, and forming from the first material a third layer of the plurality of layers being stacked between said first and second layers, wherein the optical thickness of each of said first and second layers is greater than the optical thickness of said third layer, characterized in that it includes

forming the first layer and second layer from an inhomogeneous mixture of the first material and the second material, and wherein said first layer and said second layer are each formed with an optical thickness which differs in magnitude from the value 2Q by less than Q/2, and said third layer is formed with an optical thickness which differs in magnitude from the value Q by

less than Q/2, where Q is the thickness of a given said layer traversed by substantially one quarter of a wavelength of optical radiation of a common reference wavelength at which said optical thicknesses are determined, and wherein the first and/or second layer is formed such that all variations in the index of refraction of the first and/or second layer increase that index of refraction as the depth of the respective layer increases from regions thereof remote from said third layer to regions thereof proximate the third layer.

Due to the inhomogeneous mixture of the first material and the second material when forming the first and second layers, the index of refraction of the first and second layer varies with the depth of the intermediate layers between values greater than the second index of refraction and less than the first index of refraction.

The first layer and second layer may be formed such that the optical thicknesses thereof differ, or such that the optical thicknesses thereof are substantially equal in value. Where the first layer and the second layer are each formed to have an optical thickness of equal value, this value may be substantially equal to 2Q, or may be equal to some other value differing from 2Q by less than

Q/2. The third layer may be formed to have an optical thickness substantially equal to Q.

The method may include the step of forming a pair of outerlayers, being part of the plurality of layers, each being formed from the second material wherein the outer layers are formed with the first, second and third layers being stacked between them. The pair of outer layers may